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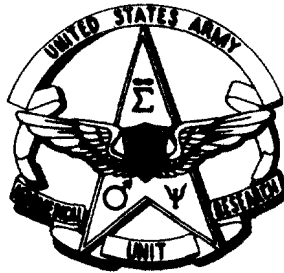
COMMENT ON CORRELATION COEFFICIENT USE

By

R. A. Avner, Capt., MSC

JULY 1966

U. S. ARMY AEROMEDICAL RESEARCH UNIT  
Fort Rucker, Alabama



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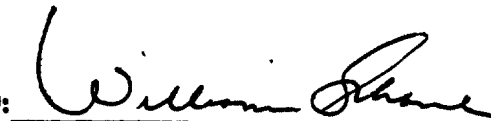
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## ABSTRACT

In computing the Pearson  $r$ , observations are identified on a nominal scale. The values assigned these observations are measured on a ratio or interval scale. Confusion of these two facts has led to the mistaken assumption that the Pearson  $r$  can measure degree of association between nominally measured variables.

APPROVED:



WILLIAM P. SCHANE

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Acting Commander

## COMMENT ON CORRELATION COEFFICIENT USE

Cronholm (1965) has stated that, despite being "...erroneously... restricted..." by certain writers (Senders, 1958; Siegel, 1956), the Pearson product - moment correlation coefficient,  $r$ , "... may be used legitimately as a measure of the linear dependence between two groups of nominally scaled observations." Cronholm suggests a modification in the usual use of  $r$  in which the nominally identified observations consist of categories rather than subjects and the ratio or interval scaled values assigned these observations are frequencies (or proportions) rather than scores.

Such a procedure has in fact been used in the past as a means of measuring such things as reliability of item difficulties. Unfortunately, while it is a legitimate correlation coefficient, such an  $r$  is not a "measure of the linear dependence between two groups of nominally scaled observations." It is rather a measure of the linear dependence between two groups of ratio scaled observations (i.e., the category frequencies) and, as such, is certainly not proscribed by Senders or Siegel.

If it is desired to measure the degree of association between frequencies or proportions of observations from 2 samples falling into the same category, this is a useful statistic. It should not be assumed however that computation of this type of  $r$  gives any measure of the degree of association between categorizations

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of observations. For this more common problem the standard nonparametric measures are recommended.

#### References

- \*1. Cronholm, J. N. "Note on the Use of the Correlation Coefficient."  
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2. Senders, V. L. Measurement and statistics. New York: Oxford Univer.  
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New York: McGraw-Hill, 1956.

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\* Also published as Army Medical Research Laboratory Reprint Report No. 642,  
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